

IN THE CLAIMS

The following claim set replaces all prior versions, and listings, of claims in the application:

Claims 1-7 (Canceled).

1. (Previously Amended) A gas sensor comprising:
a hollow cylindrical housing having an open end in which a groove is formed;
a sensor element disposed within said housing, said sensor element having a sensing portion projecting from the open end of said housing;
a cover assembly made up of an outer cylindrical cover and an inner cylindrical cover each of which includes an open end portion and a body portion, the body portion of the inner cylindrical cover being disposed within the body portion of the outer cylindrical cover in a non-contact fashion, the open end portions of the outer and inner cylindrical covers having outwardly extending shoulders, respectively, which are placed in contact with each other and fitted within the groove of said housing; and
an extension formed around the groove of said housing, said extension being bent to urge the shoulders of the outer and inner cylindrical covers into engagement with each other to install said cover assembly on said housing,
wherein said extension is welded to the shoulders of the inner and outer cylindrical covers so that a tip of the weld lies within a thickness of the shoulder of the inner cylindrical cover.

9. (Canceled).

2 10. (Currently Amended) ~~A gas sensor as set forth in claim 1, A gas sensor comprising:~~

a hollow cylindrical housing having an open end;

a sensor element disposed within said housing, said sensor element having a sensing portion projecting from the open end of said housing; and

B) a cover assembly made up of an outer cylindrical cover and an inner cylindrical cover each of which includes an open end portion and a body portion, the body portion of the inner cylindrical cover being disposed within the body portion of the outer cylindrical cover in a non-contact fashion, the open end portion of at least one of the outer and inner cylindrical covers having a shoulder which is placed in contact with the open end portion of the other cylindrical cover to establish a positional relation between said cover assembly and said housing which defines a portion of at least one of the outer and inner cylindrical covers fixed on an outer peripheral end side wall of said housing continuing from the open end thereof,

the portion of the at least one of the outer and inner cylindrical covers being welded to said housing to install the outer and inner cylindrical covers on said housing.

3 11. (Currently Amended) ~~A gas sensor as set forth in claim 2, A gas sensor comprising:~~

a hollow cylindrical housing having an open end;

a sensor element disposed within said housing, said sensor element having a

sensing portion projecting from the open end of said housing; and
a cover assembly made up of an outer cylindrical cover and an inner cylindrical
cover each of which includes an open end portion and a body portion, the body portion
of the inner cylindrical cover being disposed within the body portion of the outer
cylindrical cover in a non-contact fashion, the open end portion of at least one of the
outer and inner cylindrical covers having a shoulder which is placed in contact with the
open end portion of the other cylindrical cover to establish a positional relation between
said cover assembly and said housing which defines a portion of at least one of the
outer and inner cylindrical covers fixed on an outer peripheral end side wall of said
housing continuing from the open end thereof,
wherein the open end portion of each of the outer and inner cylindrical
covers has a side end wall greater in diameter than the body portion and a
shoulder formed between the side end wall and the body portion, the shoulder of
the inner cylindrical cover being placed in contact with the shoulder of the outer
cylindrical cover to establish a positional relation between the open end portions
of the outer and inner cylindrical covers which defines a given lap of the side end
walls of the outer and inner cylindrical covers which is joined to the outer
peripheral end side wall of said housing continuing from the open end thereof,
the portion of the at least one of the outer and inner cylindrical covers being
welded to said housing to install the outer and inner cylindrical covers on said housing.

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12. (Currently Amended) A ~~gas sensor as set forth in claim 3, A gas sensor~~
comprising:

a hollow cylindrical housing having an open end;

a sensor element disposed within said housing, said sensor element having a
sensing portion projecting from the open end of said housing; and

a cover assembly made up of an outer cylindrical cover and an inner cylindrical
cover each of which includes an open end portion and a body portion, the body portion
of the inner cylindrical cover being disposed within the body portion of the outer
cylindrical cover in a non-contact fashion, the open end portion of at least one of the
outer and inner cylindrical covers having a shoulder which is placed in contact with the
open end portion of the other cylindrical cover to establish a positional relation between
said cover assembly and said housing which defines a portion of at least one of the
outer and inner cylindrical covers fixed on an outer peripheral end side wall of said
housing continuing from the open end thereof,

wherein said housing has a large-diameter portion and a small-diameter portion
on which the outer peripheral end side wall is defined and a step formed between the
large-diameter portion and the small-diameter portion, and wherein the open end
portion of the inner cylindrical cover has a side end wall bent outward to define the
shoulder, the shoulder being placed in contact with the step of said housing while the
open end portion of the outer cylindrical cover is placed in contact with the shoulder of
the inner cylindrical cover to defines a lap of the open end portions of the outer and
inner cylindrical covers installed on the outer peripheral end side wall of said housing,

the portion of the at least one of the outer and inner cylindrical covers being welded to said housing to install the outer and inner cylindrical covers on said housing.

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18. (Currently Amended) ~~A gas sensor as set forth in claim 4, A gas sensor comprising:~~

a hollow cylindrical housing having an open end;
a sensor element disposed within said housing, said sensor element having a sensing portion projecting from the open end of said housing; and
a cover assembly made up of an outer cylindrical cover and an inner cylindrical cover each of which includes an open end portion and a body portion, the body portion of the inner cylindrical cover being disposed within the body portion of the outer cylindrical cover in a non-contact fashion, the open end portion of at least one of the outer and inner cylindrical covers having a shoulder which is placed in contact with the open end portion of the other cylindrical cover to establish a positional relation between said cover assembly and said housing which defines a portion of at least one of the outer and inner cylindrical covers fixed on an outer peripheral end side wall of said housing continuing from the open end thereof,
wherein the open end portion of the outer cylindrical cover has a side end wall and the shoulder formed between the side end wall and the body portion, the open end portion of the inner cylindrical cover having an end wall bent outward to define a flange which is placed in contact with a surface of the open end of said housing and which engages at an end thereof with the shoulder of the outer cylindrical cover to secure a

given lap of the open end portion of the outer cylindrical cover over the outer peripheral end side wall of said housing for installation of said cover assembly on said housing,

the portion of the at least one of the outer and inner cylindrical covers being welded to said housing to install the outer and inner cylindrical covers on said housing.

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14. (Currently Amended) A ~~gas sensor as set forth in claim 5~~, A gas sensor comprising:

a hollow cylindrical housing having an open end;

a sensor element disposed within said housing, said sensor element having a sensing portion projecting from the open end of said housing; and

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a cover assembly made up of an outer cylindrical cover and an inner cylindrical cover each of which includes an open end portion and a body portion, the body portion of the inner cylindrical cover being disposed within the body portion of the outer cylindrical cover in a non-contact fashion, the open end portion of at least one of the outer and inner cylindrical covers having a shoulder which is placed in contact with the open end portion of the other cylindrical cover to establish a positional relation between said cover assembly and said housing which defines a portion of at least one of the outer and inner cylindrical covers fixed on an outer peripheral end side wall of said housing continuing from the open end thereof,

wherein the open end portion of each of the outer and inner cylindrical covers has a side end wall and a shoulder formed between the side end wall and the body portion, the side end wall of the inner cylindrical cover abutting at an end thereof on the open end of said housing, the shoulder of the inner cylindrical cover being placed in

contact with the shoulder of the outer cylindrical cover to secure a given lap of the side end wall of the outer cylindrical cover over the outer peripheral end side wall of said housing for installation of said cover assembly on said housing.

the portion of the at least one of the outer and inner cylindrical covers being welded to said housing to install the outer and inner cylindrical covers on said housing.

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15. (Currently Amended) A gas sensor as set forth in claim 6, A gas sensor comprising:

a hollow cylindrical housing having an open end;

a sensor element disposed within said housing, said sensor element having a sensing portion projecting from the open end of said housing; and

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a cover assembly made up of an outer cylindrical cover and an inner cylindrical cover each of which includes an open end portion and a body portion, the body portion of the inner cylindrical cover being disposed within the body portion of the outer cylindrical cover in a non-contact fashion, the open end portion of at least one of the outer and inner cylindrical covers having a shoulder which is placed in contact with the open end portion of the other cylindrical cover to establish a positional relation between said cover assembly and said housing which defines a portion of at least one of the outer and inner cylindrical covers fixed on an outer peripheral end side wall of said housing continuing from the open end thereof,

wherein the shoulder of the open end portion of the one of the inner and outer cylindrical covers is placed in contact with the open end portion of the other cylindrical cover on a plane extending substantially perpendicular to a longitudinal center line of

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said cover assembly to secures areas of the outer and inner cylindrical covers installed on the outer peripheral end side wall of said housing.

the portion of the at least one of the outer and inner cylindrical covers being welded to said housing to install the outer and inner cylindrical covers on said housing.

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16. (Currently Amended) A gas sensor as set forth in claim 7, A gas sensor comprising:

a hollow cylindrical housing having an open end;

a sensor element disposed within said housing, said sensor element having a sensing portion projecting from the open end of said housing; and

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a cover assembly made up of an outer cylindrical cover and an inner cylindrical cover each of which includes an open end portion and a body portion, the body portion of the inner cylindrical cover being disposed within the body portion of the outer cylindrical cover in a non-contact fashion, the open end portion of at least one of the outer and inner cylindrical covers having a shoulder which is placed in contact with the open end portion of the other cylindrical cover to establish a positional relation between said cover assembly and said housing which defines a portion of at least one of the outer and inner cylindrical covers fixed on an outer peripheral end side wall of said housing continuing from the open end thereof,

wherein the inner cylindrical cover is disposed within the outer cylindrical cover coaxially with each other, the shoulder of the open end portion of the one of the inner and outer cylindrical covers is placed in annular line contact with the open end portion of the other cylindrical cover,

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the portion of the at least one of the outer and inner cylindrical covers being welded to said housing to install the outer and inner cylindrical covers on said housing.
